fact is nothing is really known concerning the nature of the combination in which the sulphur is present. It is evidently very firmly held, for the compound or compounds will stand the most drastic treatment without being broken down. There is here a fine field of investigation for any chemist who will grapple with the problem. What seems to be wanted in the first place is that these sulphur compounds should be satisfactorily isolated, and their properties studied. When we know more about them it may be possible to learn how to deal with them. We would invite attention to what is really a very promising subject for inquiry. There can be little doubt that it would yield to systematic attack by modern experimental methods familiar to organic chemists, and there are the possibilities of great material benefits to him who will satisfactorily solve the problem.

THE WASTAGE OF COAL.

THE Committee for the Investigation of Atmospheric Pollution has just issued its first report, from which it is evident that it has carried out its self-appointed task in a thoroughly scientific and (if the terms are not incompatible) business-like manner. Nineteen towns have undertaken a periodical analysis of the impurities carried down by rain falling on different stations, and also of the constituents of the dust deposited on a specially designed dust gauge of standard dimensions. These results have been tabulated in metric tons per sq. kilo. per month under the headings of insoluble matter (including tar, non-tarry carbonaceous matter, ash), soluble matter (including volatile, combustible, and non-volatile solids), and sulphuric acid (as sulphate), chlorine (as chloride), and ammonia.

The summary at the end of the report gives a comparative survey of the data from the different localities. These data naturally vary with the nature of the environment, whether industrial, residential, or rural. With the exception of some rather interesting and curious local variations, the general results are such as might be anticipated. In industrial centres, such as Oldham, Bolton, and the Ancoats district of Manchester, the impurities reach a maximum, and yield 25 tons or more of total solids per month, and proportionate quantities of sulphuric acid (3–5 tons), chlorine (0·9–1·5 tons), and ammonia (0·15–0·25 ton), whilst Malvern, situated in an agricultural area, shows a minimum record of less than 5 tons of total solids per month, the monthly mean being 2·13, with 0·50, 0·24, and 0·02 ton of sulphate, chlorine, and ammonia respectively.

This large amount and wide distribution of atmospheric pollution from burning coal (for the impurities are practically all derived from coal) raises two issues: the one a question of injury to animal and plant life, the other one of economy.

Leaving on one side the health question, and confining our attention to the economic problem, which is a pressing one in these days, we look to our coal supply, not only for fuel, but for the raw material for explosives, dyes, synthetic drugs, ferrocyanides, ammonium salts, and, to some extent, sulphuric acid, in every one of which there is a more or less serious shortage. Yet of the two hundred million tons of coal consumed annually, less than forty million tons are burnt economically, that is to say, gasified in gas retorts and by-product coke ovens, whilst the remainder, or 80 per cent., is used, not only as raw fuel in which all the valuable by-products are lost, but through incomplete, and therefore wasteful, combustion contaminate the atmosphere and the soil over an area which may be reckoned in hundreds of square miles.

Is there no way of compassing this absurdly wasteful system of utilising coal? Prof. H. E. Armstrong, in a recent address to the Society of Chemical Industry, suggested that the society should advocate an enactment forbidding the use of raw coal for domestic purposes. We are confident that such an enactment, even if it were made more comprehensive in its scope, would instantly solve the problem of the by-product wastage, and simultaneously clear the atmosphere of smoke without injury or discomfort to home or commercial life.

Faced as we are with the shortage of by-products as well as with the immediate and pressing necessity of restricting expenditure, the subject of fuel economy is one which, along with the wastage on drink, demands more than any other form of economy, on account of the prodigious sums involved, an instant and drastic change in our traditional method of *laissez faire*.

In the circumstances it is somewhat unfortunate that the Local Government Board, which instituted an inquiry into smoke abatement in the spring of 1914, should have suspended its sittings just at a time when the result of its deliberations might have borne some fruit; and it is to be hoped that a similar committee having wider powers may shortly be appointed to deal with, in addition to smoke abatement, the larger question of the wastage of coal.

J. B. C.

NOTES.

THE tercentenary of Shakespeare's death is being commemorated this week, and tributes to his genius are being paid in many other parts of the civilised world. The event may not be regarded as of particular scientific significance, yet to let it pass unnoticed in these columns would be to show a want of pride for the memory of the greatest master of our literature. In the Elizabethan age, the cockatrice, the mermaid, the phœnix, the unicorn, and like legendary creatures were realities to the general public, and as such were referred to in the works of the great dramatist and other contemporary writers. We have, for example, in "The Winter's Tale," the line, "Make me not sighted like the basilisk," and in "The Tempest," "Now I will believe that there are unicorns." Not only was more or less credulity given to the existence of these and other fabulous creatures, but a web of mystic lore encircled the most common and best known of beasts, birds, and fishes. But though Shakespeare gave credence to many of the legends he quoted, especially in regard to the animals and plants of distant lands, he had a greater knowledge of natural history than many of his contemporaries. An article in the *Times* of May 2 shows that he was familiar with the characteristics and habits of many birds, and the accuracy of his references to them would do credit to a modern field naturalist. The greatness of Shakespeare, however, lies not so much in the fact that he reflected in his works the best knowledge of his time, which is more than can be said of most writers to-day, but that he enriched and defined with thought what most people feel, and perceived in Nature resemblances and meanings which are hidden to the ordinary mind. In these respects, poetry is independent of knowledge, which does not, however, destroy the magic and the mystery upon which the imaginative mind can play, but transfers them to higher planes. For Shakespeare's knowledge and his power to set in vibration every chord of the human spirit, we join this week in reverent admiration with lovers of good literature throughout the Empire.

THE special correspondent of the *Times* at Amsterdam reports that the change of the legal time-standard in conformity with the daylight saving scheme came into force in Holland on May 1 without any appreciable disturbance of the daily life of the community. All clocks were put forward one hour at midnight on Sunday; therefore, instead of 1 o'clock, 2 o'clock was struck one hour after midnight. This "summer time" will be used until October 1. It is stated that there has been little opposition to the change except among Frisian farmers and dairymen, who, for practical reasons connected with haymaking and milking, desire exemption from observance of the new time. The *Times* correspondent adds that calendars giving the times of the rising and setting of the sun necessarily require readjustment to the altered time. He does not indicate, however, how this change is to be effected; that is to say, whether the calendars are to show astronomical occurrences, such as times of sunrise, sunset, moonrise, tides, and so on, according to one time-standard in summer and another in winter. In legalising the daylight saving system, Holland has followed Germany and Austria, which introduced it by administrative decree on May 1. A Bill with the same object has been passed by the French Chamber of Deputies with the support of the Government, and is now before the Senate; and Sir Henry Norman has handed in the following notice of motion at the House of Commons:—"That, in view especially of the economy in fuel and its transport that would be effected by shortening the hours of artificial lighting, this House would welcome a measure for the advancement of clock time by one hour during the summer months of this year."

A LETTER of Sir Lauder Brunton to the *Lancet* of April 3, 1915, anticipates to some extent the recommendations contained in the memorandum on "Industrial Fatigue and its Causes," issued by the Health of Munition Workers' Committee, and described in our issue of April 20 last (p. 162). Sir Lauder Brunton refers to an experiment made many years ago by the late Mr. Lindsay Russell, Surveyor-General of Canada, and Prof. Pearce when surveying the boundary-line between the United States and Canada. From the force of circumstances it was sometimes necessary to work the men for seven days a week, and several weeks at a time. On other occasions, when there was no necessity for such extreme exertion, the men were only worked six days a week, and allowed to rest completely on the seventh day. It was possible to calculate exactly the amount of every man's daily work in foot-pounds. On reckoning it up it was found that the number of foot-pounds done by the men working six days a week was almost the same as when they worked seven days a week. Sir Lauder Brunton expresses the opinion that in all probability if munition workers work at their full capacity for six days it will be better both for them and the work they turn out that they should rest on the seventh.

WE are glad to note that the Reale Accademia dei Lincei of Rome is taking up the question of the maintenance of the zoological stations at Naples and Messina, and that the Italian Government is being asked to provide the means for continuing the work of these institutions.

AT the ordinary scientific meeting of the Chemical Society, to be held at Burlington House on Thursday, May 18, at 8 p.m., the last of the three lectures arranged for this session will be delivered by Prof. F. Gowland Hopkins, F.R.S., who has chosen as his subject, "Newer Standpoints in the Chemical Study of Nutrition."

MR. CLIFFORD C. PATERSON, a principal assistant in the physics department of the National Physical Laboratory, is to join the Osram-Robertson Lamp Works, Ltd., as director of laboratories for research and technical manufacturing purposes. The arrangement will commence at the conclusion of the war or before that date if possible.

A SHORT account of the career of the late Mr. Erasmus Darwin Leavitt, who died on March 11, appears in *Engineering* for April 28. Mr. Leavitt was a well-known American engineer, and was one of the pioneers who developed the use of high steam pressures in stationary engines in the United States. He was one of the founders of the American Society of Mechanical Engineers, and was elected president in 1883.

THE death of Mr. John Tweedy is announced in *Engineering* for April 28. As vice-chairman of Messrs. Swan and Hunter, the well-known Tyne shipbuilders, he was one of the leaders in the design of high-speed merchant craft. One of the notable services which he rendered was connected with the balancing of the engines, and his name will be remembered in connection with the Yarrow-Schlick-Tweedy system of balancing. He was elected president of the North-East Coast Institution of Engineers and Shipbuilders in 1902, and for some time served on Lloyd's technical committee.

THE report for the year ending June 30, 1915, of the secretary of the Smithsonian Institution contains some interesting facts as to the amount of money the institution has at its disposal for the assistance of scientific research and exploration and for general administration. Its total permanent fund amounts to 205,920*l*. The income of the institution during the year dealt with was 22,408*l*. With the balance of 6112*l*. on July 1, 1914, the total resources for the year amounted to 28,520*l*. The disbursements for the year amounted to 20,086*l*. The institution was charged by Congress also with the disbursement of grants for scientific work amounting to 121,200*l*.

THE late Dr. P. Wharton-Hood, who died at the advanced age of eighty-two, on April 27, rendered an important service to surgery early in his career. His father, Dr. Peter Hood, a well-known physician in London, had attended Mr. Hutton, the famous "bone-setter," through a long and severe illness. In acknowledgment of the father's services, Mr. Hutton imparted to the son all that pertained to the practice of "bone-setting," and what was found to be good in that practice was given by the son to the medical profession in a series of articles contributed to the *Lancet* in 1871. The late Dr. Wharton-Hood and his father, Dr. Peter Hood, were pioneers in the introduction of massage as a legitimate and effective means of treating sprains and other injuries. The son's best-known work is "The Treatment of Injuries by Friction and Movement," which was published in 1902.

In a circular issued to the fellows of the Chemical Society, the treasurer states that the council has decided to publish portraits of the three past presidents, Sir Henry Roscoe, Dr. Hugo Müller, and Prof. Raphael Meldola, who have died during the past year. The portraits will be suitable for framing or for binding with the Journal, and will be sold at a cost not exceeding 1*s*. 6*d*. each to those fellows who apply to the assistant secretary before August 1, 1916. If there is expressed a sufficiently general wish to possess portraits of other past presidents, arrangements will be made to carry this into effect. A complete list of the thirty-four past presidents of the society is given, and fellows are requested, when sending in their applications, to denote on the form provided which portraits they desire to possess.

Astronomical science has lost an energetic worker by the death of Dr. W. F. King, C.M.G., the chief astronomer of the Department of the Interior of Canada, who had done so much to systematise and extend the work of the Dominion Observatory at Ottawa. Born in England, in 1854, he early went to Canada, and was educated at Toronto University, passing out as one of the most brilliant of its alumni. His active scientific career began with the work of the International Boundary Commission, and from his last issued report we find that he was still actively engaged upon geodetic problems. These included the determination of the boundary line through Passamaquoddy Bay, the re-survey of the 49th parallel and that of the 141st meridian. In a new country such delimitations are pressing and important, and Dr. King worked on them with vigour and success. To him also fell the duty of organising the Ottawa Observatory and the settlement of its programme of work. His official position required him to encourage and support many new scientific schemes and institutions that mark the rise and progress of the Dominion. In no department is Dr. King's work better seen and acknowledged than in that of spectroscopy, as carried out in the Dominion Observatory. The observations are of the highest character and interest, and in the large outcome he took an active part. The bold scheme of supplementing the optical equipment of the observatory by the addition of a 60-in. reflector was his conception, and the progress made in its construction is due not a little to his energy and enthusiasm. The excellent seismographic work, embracing a wide network of stations, though under the immediate superintendence of Dr. Klotz, is another evidence of his administrative ability, and the magnetic survey carried out with vigour over a large area similarly displays the extent of his resources and the power of his organisation.

An interesting experiment in the practical application of anthropology is to be made shortly in the United States. One of the great difficulties of the Administration has been the question of the alienation of land of Indian holders. These lands are frequently of value on account of their timber, and their purchase by speculators at absurdly inadequate prices, and the consequent impoverishment of the Indians, have been a scandal, to which Dr. W. K. Moorehead in particular has directed attention on more than one occasion. In Minnesota power to sell their land is vested only in owners of mixed Chippewa descent; the land of the pure-blooded Chippewa is inalienable. Speculators have, however, been successful in getting hold of it, and the Government has had to intervene. As a result, to prove title it has been necessary to show the mixed descent of the vendor. This is a matter of some difficulty, and a prominent anthropologist has been invited to visit the Chippewa with the view of deciding the question of mixed descent in the cases in dispute. The lawyers of both sides have agreed to abide by his verdict. This solution will recall certain recent proceedings in our own courts, but it is to be hoped may lead to a more decisive result.

A valuable article in the current Journal of the Royal Anthropological Institute (vol. xlv.) is that by Mr. R. Grant Brown, on the Taungbyon festival in Burma, illustrating the animistic basis of the Buddhism of the province. It represents the cult of Two Brothers, who are said to have been Mohammedan martyrs. The chief part of the rite is the ceremonial cutting down of two *teinbin*, or coffeewort, trees (*Nauclea cordifolia*) by officiants representing the Two Brothers. These trees are, except in connection with their cult, not otherwise regarded as sacred. The custom raises some interesting questions the origin and meaning of which continue to be obscure. Do the trees, as Sir James Frazer would say, represent the Spirit of Vegetation, slain at the ceremony, and at a later time reborn in the fields? Or, as Mr. Brown seems to prefer, did one of these trees, according to Prof. Ridgeway's speculations, once grow on the grave of the martyrs, and thus came to be held sacred, and its branches were distributed to the people because they were supposed to be impregnated with the spirits of these holy men? Mr. Brown justly remarks that it is not necessary to assume a single origin for any custom, and a custom may be continued for reasons altogether different from those which originated it. It seems to be possible that the Two Brothers were deified on account of the strong feeling of local patriotism because they opposed the tyrannical native dynasty. In any case, it is interesting to note that these Mohammedan brothers were deified among a strictly Buddhist population.

A large portion of the *American Naturalist* for March is accorded to Profs. Stockard and Papanicolaou, to enable them to complete their analysis of the hereditary transmission of degeneracy and deformities by the descendants of alcoholised guinea-pigs, already alluded to in these columns. The authors find that the offspring of alcoholised females have a higher viability than in the case of alcoholised males, from which they conclude that the male germ cell is more affected by alcohol than the ovum. The male offspring of alcoholised females are inferior to their female offspring. The female offspring of alcoholised males show a higher mortality and more deformity than the male offspring, from which they conclude that the female-producing sperms are more modified by treatment than male-producing sperms.

The spring number of ***Bird Notes and News***, the organ of the Royal Society for the Protection of Birds, reports that a fresh raid by plume-hunters has been made on the albatrosses of Laysan Island, one of the largest of the U.S.A. bird reserves. The breast feathers only seem to have been taken, and to obtain these between 150,000 and 200,000 birds were slain, their bodies being found lying in heaps all over the island. The majority of the victims were furnished by the white- and the black-footed albatross, and after these the greatest sufferers were frigate birds and the blue-faced booby. This iniquitous traffic in plumes could now be effectually killed if the import of plumage into this country were prohibited. Having regard to the restriction in imports now in force, this item might well be added to the list. The ghastly toll of bird-life demanded by the milliners has long been a standing disgrace to civilised communities. At the present juncture the Government might well prohibit entirely the importation of all plumage—ostrich feathers and eiderdown only excepted—as a useless and undesirable import, and a wholly indefensible form of extravagance.

In a recent number of the Journal of the College of Agriculture, Tohoku Imperial University, Japan, Mr. Schin Yoschida gives an account of a series of interesting researches. He has investigated the manner in which "milk" is formed in the crops of brooding pigeons. The so-called "milk" is not produced in glands, but by a proliferation and fatty degeneration of the epithelial cells lining the crop. The growth and shedding of the epithelial cells occur only during the brooding season, and affect both male and female birds. Mr. Yoschida has also made further inquiries into the nature of the horny masses (callosities and ergots) found on the legs of horses. He maintains that an examination of their microscopical structure supports the contention that these horny masses represent the hoofs of two of the missing or vestigial digits of the horse. He infers "that the callosity is the nail of the second toe, and the ergot (the horny spur hid by the hair of the fetlock), of the fourth toe."

The first part of the ninth volume of the Journal of the Marine Biological Association contains an account of some biometric investigations carried out in connection with the question of the localisation of the different races of herrings inhabiting North European seas. The first investigation of this kind was made by Matthews, for the Scottish Fishery Board, about the end of last century, and somewhat later Heincke made a similar study of herrings obtained mainly from the Baltic. Criticism of Heincke's work showed defects of treatment, and his conclusions, as well as those of Matthews, were seen to be of little value since they were deduced from insufficiently large samples. As the question of the distribution of local races of herrings has considerable importance in fishery regulation, the Board of Agriculture and Fisheries organised, in 1913, a comprehensive scheme of investigation applying to all parts of the British seas, and a number of fisheries laboratories arranged to take part in the work. One result of the war has been, of course, the suspension of most of this investigation, but fortunately all the organisation had been completed prior to August, 1914, and some progress was made during 1915. Dr. Orton, in the paper now noticed, gives an account of the practical methods employed at Plymouth by himself and his colleagues. Some eighteen variable characters were measured in each of well above 1000 herrings. As there is no immediate likelihood of a general discussion and analysis of all the results obtained by the Board, the details of this investigation of the Channel herrings are now tabulated and published.

In Kew Bulletin, No. 2, 1916, several new species of plants are described from India, China, and Africa. Among the African species is *Gardenia fragrantissima*, Hutchinson, of which an illustration is given; *Utricularia papillosa*, Stapf, from Nigeria; and an interesting Asclepiad, *Caralluma carnosa*, N. E. Brown, from the Transvaal, which is illustrated by a plate from a photograph taken in the garden of the Botanical Laboratory, Pretoria, by Mr. Pole Evans, the discoverer of the species. Two interesting and little-known South African Euphorbias are also illustrated by a plate in this number, *E. pubiglans*, a native of Port Elizabeth, and *E. enopla*, with fierce spines which are modified peduncles, from the Witte Poort Mountains and the Karoo.

A SUMPTUOUSLY illustrated paper by Mr. S. Okamura on the mosses of Japan has recently been issued as article 7 of vol. xxxvi. of the Journal of the College of Science, Tokyo. These contributions include citations of new localities and descriptions of new species from the island of Sachalin and from the Corean peninsula. Among the new species may be mentioned a minute and interesting Archidium, *A. japonicum*, with a stem 2–5 mm. high, from the Prov. Musashi, Hondo. *Schistostega osmundacea*, the luminous moss, is now recorded from several localities in Japan for the first time, having previously only been known in Europe and North America. A new aquatic moss, *Bryhnia Nakanoi*, is also described and figured.

One of the railway problems of the near future must be the linking of the Balkan lands to western Europe by a route independent of the Central Powers. To find an alternative to the railway route *viâ* Vienna and Budapest to Constantinople will strengthen the relations of Italy and France with the Balkan people at the expense of Austria and Germany. In a paper on the Adriatic Slavs (*Geographical Journal*, xlvii., April, 1916), Sir Arthur Evans advocates the reopening of the old Roman route by the Save valley from Lombardy to Belgrade. A few miles between existing railways would make the line complete from west to east, and, subject to the formation of a South Slavonic State in the Illyrian region, would constitute a route to Belgrade more direct from France and England than that *viâ* Vienna. By Milan, Padova, Gradisca, and Laibach, it would be possible to reach Belgrade from London in thirty-nine hours, compared with 44½, the time taken by the Orient express before the war. The saving in time would be proportionately much greater from many parts of France. In connection with this article attention may be directed to another, in the same number of the *Geographical Journal*, by Mr. H. C. Woods, on communications in the Balkans, which is illustrated with maps.

Prof. A. Riccò has contributed to the Italian Seismological Society an interesting paper on the distribution of the epicentres of the greater Italian earthquakes (Bollettino, vol. xix., 1915, pp. 35–47). He shows that these epicentres are arranged chiefly about the crest of the Apennines and its continuations. The distance between successive epicentres varies from 25 to 110 km., the average distance being 50 km. The area of total or partial ruin is usually bounded by a curve, which is elongated in the direction of the mountain-chain, and the longer axis of this curve varies in length from 30 to 300 km., the average length being more than 120 km. Thus the greater part of the Apennine axis is marked out by the ruins caused by earthquakes. Prof. Riccò notices that the same centre is often revisited by great earthquakes; for example, eight earthquakes have originated in the Norcia centre from 1328 to 1860, and ten in the Cassino centre from 1004 to 1891.

The Canadian Department of Mines has issued a very full description of the Canadian oil-fields under the title of "Petroleum and Natural Gas Resources of Canada," in two bulky volumes. The first volume deals with the occurrence and distribution of oil-fields in various parts of the world, with the chemical and physical properties of petroleum and natural gas, and the methods employed in drilling wells, in pumping, storing, and transporting oil and gas, and with the utilisation and conservation of these substances; the second volume contains a detailed description of the various Canadian oil-fields. The work is one of the greatest value to all interested in any aspect of this very important industry. In this connection attention may be directed to the very full account of the natural gas industry to be found in a paper by Dr. J. A. L. Henderson, read on March 21 before the Institution of Petroleum Technologists.

In the *Rassegna Nazionale,* xxxviii., (2), 1, a fortnightly review dealing mainly with politics and literature, science is represented by a popular article on "Infinity" by Pietro Pagnini, in which the peculiarities of infinite space, time, and number are discussed.

About the first fortnight of March, 1915, the peach blossoms in the gardens at Rome were damaged by the larvæ of a micro-moth identified as *Recurvaria nanella.* An account of the biology of this insect is given by Armando Mignone in the *Atti dei Lincei,* xxv., (1), 3, 5. It belongs to the family Gelechiidæ, and the description of the European form appears to be identical with Scott and Paine's observations in the United States. The imago spends most of the day resting with wings closed on the peach and certain other fruit trees. The larvæ, which are hatched in the autumn, are leaf-miners, making long tunnels in the leaves. In the winter they come out and hibernate in places where they are almost invisible, investing themselves with a silk covering, and the following spring they emerge and attack the young buds.

Special Publication No. 33 of the Department of Commerce of the United States Coast and Geodetic Survey deals with the results up to the present time of the magnetic survey of the country and of the adjoining seas. These results are given in the form of tables, and are embodied in a chart to a scale of about 110 miles to the inch. The *isogonic lines,* or lines of equal deviation of the compass from true north, are drawn for each degree of deviation from 24° east in the north-western States to 24° west in the north-eastern States. The date for which they hold is January 1, 1915. In the north-western States the isogonic lines run nearly east and west, in the central States nearly north and south, and in the eastern States north-west to south-east. In the west and south they are fairly regular in shape, but in the east and in the regions south of the great lakes they are much folded. Along a line from Florida to a point 100 miles west of Lake Superior there is no secular change in the deviation of the compass; at points east of this the north end of the compass needle is moving to the west at a rate which exceeds six minutes of arc per annum in the north-eastern States, and at points west of the line the north end is moving to the east at a rate which is nearly four minutes per annum in the south-western States.

The *Royal Engineers' Journal* for April contains an article on explosives compiled from one which appeared originally in the *Revue Militaire Suisse.* All the more generally used explosives are described, with some account of their manufacture. No mention is made, however, of modern methods of making nitrocellulose; only the old pot method is described. Similarly, recent improvements in the manufacture of nitroglycerine are not referred to. Reference is made to the interesting explosive residue left when a rhodium-zinc alloy is dissolved in hydrochloric acid, this residue exploding when heated to 400° C. in a vacuum. In conclusion, it is pointed out that it is by no means possible to state definitely which is the best of the "high explosives"; probably the most powerful one in use is tetranitroaniline. It would be extremely difficult to produce a substance having greater explosive force than those already discovered and in use at the present day. Whether any advantage would be gained by the discovery of explosives which are more powerful than those already in use is another matter. With "high explosives," once it is possible to plant them on the exact spot at which it is desired to effect destruction, such destruction can be effected with as great completeness by the employment of one of the present-day "high explosives" as with any new one which may be discovered. On the other hand, any increase in the "safety" properties of "high explosives," and improvements in other directions tending towards facilitating their transport, would be a gain from a military point of view.

R. L. Datta and N. R. Chatterjee have recently described (Journal of the American Chemical Society, 37, No. 3) the action of aqua regia on acetone, ether, methyl, ethyl, and allyl alcohols, and formic and acetic acids, with the production of chloropicrin. The yield of the latter substance is almost quantitative in the case of acetone and allyl alcohol when the reaction mixture is warmed. It is stated that the following method of preparing chloropicrin is far preferable to Hofmann's method in which bleaching powder is allowed to act on picric acid. To a mixture of two parts of nitric acid with three parts of hydrochloric acid, a quantity of acetone equal to one-tenth part of the acid mixture used is gradually added, the reaction mixture being warmed slightly. After heating on a water-bath to complete the reaction, the liquid is steam-distilled, the compound separated, dried over calcium chloride, and finally redistilled at a slightly reduced pressure.

Messrs. George Allen and Unwin, Ltd., are publishing at an early date, for the Polish Information Committee, pamphlets entitled "The Landmarks of Polish History," "The Polish Question as an International Problem," "An Outline of the History of Polish Literature," "National Music of Poland," and "Poland as an Independent Economic Unit." Further pamphlets, entitled "A Sketch of Polish Art," "The Population of the Polish Commonwealth," "Poland as a Geographical Individuality," and "Intellectual Poland," are in active preparation.

OUR ASTRONOMICAL COLUMN.

Variable Stars of Short Period.—Prof. E. C. Pickering directs attention to some similarities and peculiarities in the formulæ representing the light variations of the typical short-period variable stars (Circular 190, Harvard College Observatory), not only affording criteria for purposes of classification, but also indicating structural features. It is found that β Lyræ should be regarded as intermediate between the Algol eclipse variables and the δ Cephei stars—exactly the order, it may be added, demanded by Sir Norman Lockyer's meteoritic hypothesis.

Photo-electric Photometry.—Prof. J. Stebbins gives some details regarding the employment in stellar photometry of a specially sensitive rubidium cell (Lick Observatory Bulletin, No. 277). This particular cell is an outcome of some two years of conjoint research with Prof. J. Kunz. The observational work was carried out at Mount Hamilton, June 21–July 30 last year, and several sets of measures are included for nearly every day during the interval embracing three cycles of the star's period. Important real irregularities are revealed, but the mean light curve has nevertheless been determined. The two maxima are found to be practically equal. A marked asymmetry of the light curve on each side primary minimum (the decrease of light being more rapid than the increase) is explained by an assumed non-uniform surface intensity